

REMARKS

Request for Reconsideration

Applicants have carefully considered the matters raised in the outstanding Office Action but remain of the opinion that patentable subject matter is present. Applicants respectfully request reconsideration of the Examiner's position based on the above amendments to the Claims and the following Remarks.

Claims Status

Claims 1-12 had been examined and this Response amends Claims 1, 4, 8 and 11 and cancels Claims 3 and 10. Thus, the claims presented for further prosecution are Claims 1, 2, 4-9, 11 and 12.

Claim 1 has been amended herein to add the limitations of Claim 3 and portions of the limitations from Claim 4. Thus, Claim 3 was canceled and Claim 4 amended.

Claim 8 has been amended to add the limitations of Claim 10 and a portion of the limitations from Claim 11. Thus, Claim 10 has been canceled and Claim 11 has been amended.

Respectfully, these amendments add no new matter to the claims.

Present Invention

The present Invention is directed to a rotating mirror which has minimal positional error during rotation even at high speeds in the neighborhood of 50,000 rpm's or more.

One of the novel aspects of the present Invention which allows for nominal positioning error is the roughening of the holding surface of the flange member and/or the held surface of the mirror. Specifically, Applicants have found that, by roughening one or both of these surfaces to within a specific range, superior results are obtained. These superior results are evidenced in Table 1 which bridges pages 15 and 16 of the Application. As can be seen in Table 1, having a surface roughness greater than 20, and specifically 32, results in a high

tangle angle compared to deflection devices that have a roughness within the claimed range, namely, mirrors 2-6. Furthermore, it can be seen that deflection devices having a roughness below the claimed range, namely, mirrors 7, 8 and 9, have a high vibrational change compared to the present Invention. The results are discussed starting on page 15, line 5 and going over to page 17, line 5 of the Application.

It is recognized that this data is not presented in declaration form, however, it is does represent experiments that have been run and reported in the Application and, therefore, are deemed to be entitled to some weight in consideration of the novelty and non-obviousness of the present Invention. Respectfully, the Table clearly demonstrates the criticality and uniqueness of the claimed range for roughness.

As noted above, Claims 1 and 8, which are the independent claims in this Application, have been amended herein to recite this critical roughness range of 3 μm to 20 μm .

Furthermore, Claims 1 and 8 have been amended herein to recite that the adhesive, which is used to bond the mirror to the flange, has a specific Young's modulus of not more than 1700 MPa.

There is close relationship among the material with respect to the roughness and the hardness of the adhesive as brought out in the Application on page 14, lines 14-22. As shown in Figure 5, the projections formed by the roughening are filled with adhesive and, consequently, form a very firm bond between the mirror and the flange which results in good stability to the mirror even when rotating at high speeds of 50,000 rpm's.

Respectfully, the art cited by the Examiner does not teach the specific roughening of 3 to 20 μm nor the use of an adhesive, let alone an adhesive having a Young's modulus of not more than 1700 MPa.

Rejection

Claims 1-12 had been rejected as being unpatentable over Isobe.

Isobe teaches securing mirror 3 to sleeve 2 using screw 6 and anchoring member 5.

At Column 5, line 55, Isobe teaches that mirror seat 2c is finished to a very high accuracy and roughness in advance. What Isobe fails to teach is what is that roughness. As noted above and as demonstrated in Table 1, there is a critical range of roughness in order to obtain good stability for the mirror. Isobe is silent as to what the numerical value of the roughness is, let alone teaching or suggesting the range which is currently recited in the independent claims of the present Invention.

The Examiner has taken the position that Isobe teaches adhesive 4 as shown in Figure 3. Applicants respectfully traverse this reading of Isobe. In Figure 3, element 4 is an annular groove wherein 4a is the inner periphery of the upper edge of the annular groove and reference 4b is the outer periphery of the upper edge of the annular groove. Nowhere in Isobe does he teach the use of an adhesive.

Thus, employing an adhesive between the mirror and the sleeve is neither taught nor suggested in Isobe. As noted above, Applicants have amended their claims to specifically point out that Applicants employs an adhesive between the holding surface of the flange and the held surface of the mirror.

Conclusion

In view of the amendments to the claims and the Remarks, Applicants submit that their Application is in condition for allowance and such action is respectfully requested. Should any extensions of time or fees be necessary in order to maintain this Application in pending condition, appropriate requests are hereby made and authorization is given to debit account # 02-2275.

Respectfully submitted,

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